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RECORD OF REVISIONS

Rev	Date	Description	POC	RM
0	10/27/06	Initial issue. Also includes IBC and IEBC requirements formerly in Ch 1 Section Z10.	Tobin Oruch, *CENG-OFF*	Kirk Christensen, *CENG-OFF*
1	6/19/07	Added approval of certain design changes and special structural product qual section; organization and ML level changes; minor clarifications.	Tobin Oruch, *CENG-OFF*	Kirk Christensen, *CENG-OFF*
2	7/21/08	Clarified scope, Chief Inspector duties, design review duties, need for control of concrete prefab, occupancy. Removed IAS automatic pathway for testing agencies. Minor changes to Att 1 and 2 related to beneficial occupancy and App A and B.	Tobin Oruch, *CENG-OFF*	Kirk Christensen, *CENG-OFF*

PLEASE CONTACT THE ESM IBC PROGRAM POC
for upkeep, interpretation, and variance issues

Section IBC-GEN	**IBC Program POC and Committee**

LANL Eng Standards including this one: http://engstandards.lanl.gov

1.0 Purpose, Scope, and Applicability

A. Purpose of this Chapter: To establish the LANL building code program, including the authority and duties of the LANL Building Official (LBO). The LBO function is integral to enforcement of the International Building Code (IBC), International Existing Building Code (IEBC), and other building-related LANL Engineering Standard requirements. The LBO does this enforcement through design reviews and field inspections; those performing such work must be delegated the LBO to act on the LBO's behalf.

B. Scope: The IBC and IEBC apply to all LANL Management Levels (MLs, for quality etc.) of building work covered by their scopes. The IEBC addresses repairs, alterations, changes of occupancy, additions, and demolition of buildings and systems.

1. "Systems" above shall be taken to mean typical building systems and structures. Based on the IBC and IEBC scope and purpose statements, code topics addressed, and typical use by jurisdictions, the IBC and IEBC (and thus this chapter) generally do not apply to process or analytical equipment. Installation, modification, and demolition of such equipment and similar "tenant improvements" or installations therefore need not follow the IBC, IEBC, or this chapter except:

   i. When such equipment could affect structural integrity, fire safety, life safety/means of egress, facility system safe performance. Examples of in-scope work: adding large new electrical loads or demands on other common utilities; "structural" post-installed anchors per ESM Chapter 5 Section II Appendix A.

   ii. When programmatic or process systems are being modified greater than 50% of their replacement value, in which case the "50% Rule" for programmatic system provisions in IBC-GEN App B, *LANL Existing Building and System Code*, must be applied so that aged systems are brought up to current safety standards.

   iii. Moreover, the Chapter POCs, lead Chief Inspectors, and Facility Design Authority Representative (FDAR, ref IMP 342) are delegated authority to make day-to-day determinations as to whether proposed work is subject to the IBC/IEBC within this section's definition, and after consideration of the examples below (FDAR decisions are subject to review/revision by LBO).

   Examples of modifications not requiring IBC Program compliance: Installation or removal of plug-fed analytical equipment; removal of system furniture; security systems (although anchorage must meet IBC and ESM Ch. 5); removal but not installation of gloveboxes and fume hoods, and support systems for same (fire protection excepted).

   Note: Exclusion from this chapter's requirements does not include exclusion from other codes such as the NEC, nor exclusion from other requirements elsewhere in the ESM including 10CFR851 and inspections required based on ML level, written LANL policy, or otherwise.

2. The IBC-driven quality requirements shall not be diminished, changed, or influenced by the funding source, type of project or job, or any other designation unless approved by the LBO.

3. Additional requirements are expected for ML-1 and ML-2 (nuclear) and ML-3 work; such higher-quality processes cannot reduce IBC levels of quality or inspections unless specifically authorized by the LBO in writing.

4. *Guidance: ML-1, ML-2, and ML-3 work will normally require additional controls above the IBC-driven basics due to the nature of these projects.*

C. Applicability: LANL organizations and their subcontractors are required to comply with this Chapter and to support the LBO and its activities in support of the IBC/IEBC.

1. The requirements of this chapter new to the ESM are required for new project starts after 10/27/06 (ref Chapter 1 Section Z10 Code of Record subsection regarding projects underway). Exceptions to this grandfathering:
   a. Requirements in this chapter which are not new. This includes the requirement for the structural engineer to submit "special inspection, test, and structural observation requirements" per IBC Ch. 17 (required for projects underway after 2/9/04 per definition in ESM Ch. 1 Section Z10).[1]
   b. The new requirement for Certificate of Occupancy shall be implemented for all projects, new starts and those underway.[2]
   c. Small facility modification projects meeting either the IEBC Level 1 Alteration definition[3] or the AP-341-506, Engineering Change Notice Form FM01 criteria for Type II (low-risk/impact) ECNs are exempt from the IBC-specific design review and inspection requirements described by this chapter. Such work shall, however, follow the LANL amendments to the IBC and IEBC in this chapter as well as other requirements in the ESM and elsewhere (and have design review, inspection, and QA appropriate to risk).

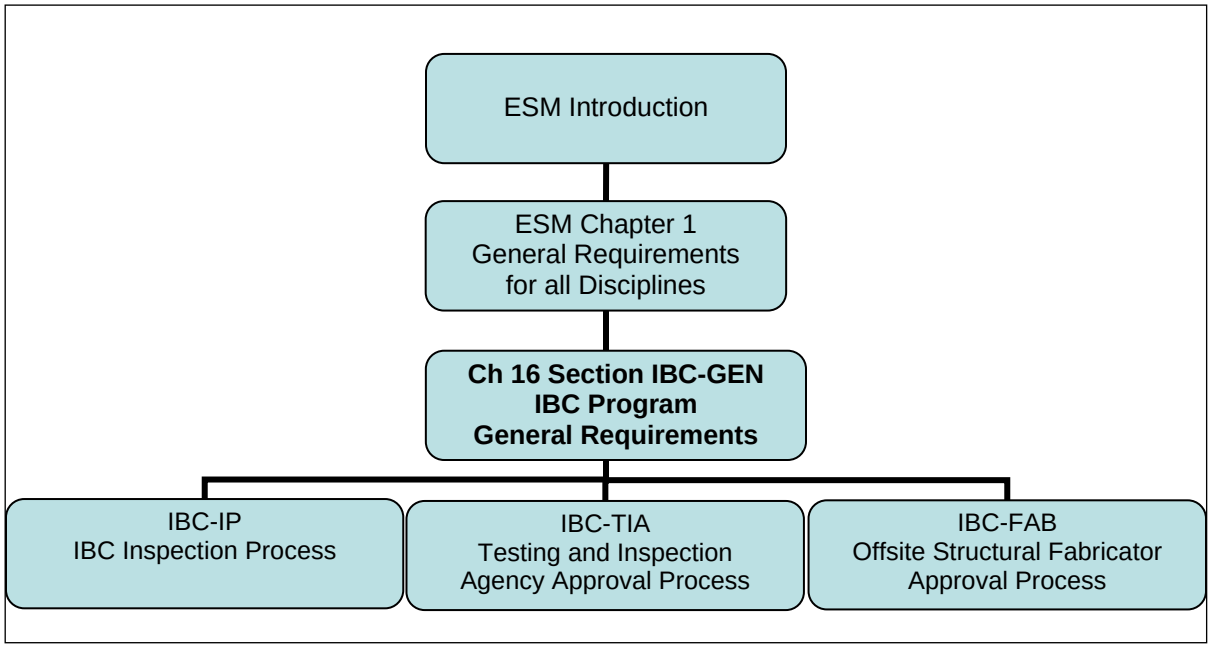
   Guidance: At time of writing (506 FM01 r0), ECN Type I projects <u>not exempt</u> from the LBO-related design review and inspection requirements are those that answer "Yes" to one or more of these questions:
   - does the proposed modification potentially affect an ML-1 or 2 SSC?
   - have a total project cost of greater than $500K?

[1] Inspection/test/observation QA plan has been required by the ESM Structural Chapter 5 since 2/9/04. Ref Section I, Subsection on Project Records for Structural Design, paragraph E on Test and Inspection Requirements.
[2] Cert. of Occupancy is a LANL-internal process that should not affect existing subcontract awards, and has minimal impact on overall project cost, and was requested by LASO fire safety management circa 2007.
[3] This is removal and replacement of existing materials; risk/return for this or ECN Type IIs (small, internally- or maintenance workforce-performed modifications) does not justify the effort at this time of IBC program phase-in; instead, LANL uses a graded approach, excluding it from the full IBC program requirements (central review/permit stamp, central IBC inspection, and occupancy permit). Moreover, a $500k mod affords a modest renovation or system addition, on the order of IEBC Level 1 or 2 Alteration which could include reconfiguration of space or system, extension of a system or addition of equipment, etc. Additionally, because LANL attention to safety, codes, and standards is higher than outside LANL, it is likely that most Type II ECN work is performed to Code even though exempted from LANL's full IBC Program as noted above (this is certainly the case with electrical work, as it is subject to a strong electrical safety program). In fact, all work, including Type II ECNs, requires checking of design by a competent individual. Per the Type II instructions: "*RE verifies that all design documentation has been checked by the design agency. Checking is required by the design agency's quality assurance program.*" This provides added assurance of safety and that no work gets installed at LANL without proper review to ensure code compliance. With the current funding and manpower constraints, the exclusion of such low-risk modifications is appropriate since the level of risk associated with Type II ECNs doesn't warrant the level of oversight/control of the full IBC program.

- require project management processes for a Type 3 or Type 4 Project?
- alter Priority documents?
- alter Category 1 or 2 software?
- affect the seismic integrity of an ML-3 or ML-4 SSC which could impact an ML-2 SSC?
- affect NEPA, Cultural Resources, and/or Biological Resources?
- affect air quality or water pollution control?
- affect a credited SSC controlling exposure to radiation? (N/A to temp shielding)
- require a complex or high-risk installation sequence?
- involve installation by other than the LANL Support Services Subcontractor[4]?

D. Where the LANL Engineering Standards or any design for LANL refers to the IBC or IEBC, also refer to the LANL amendments in Appendices A and B of IBC-GEN.

2.0 Chapter Hierarchy



3.0 Acronyms /Definitions

ACRONYM/TERM	DESCRIPTION
ASTM	ASTM International
Chief Inspectors	Specific LANL individuals delegated by LBO to oversee LBO program day-to-day. They are typically in a QA role or the Construction Engineering Group of Construction Management Division, with the CM-CE Group Leader being the primary Chief Inspector.
Contractor	The LANL Managing and Operating organization (e.g., LANS)
CQAP	Construction Quality Assurance Plan

[4] With SSS being absorbed in 2008, this can be interpreted to mean performed by LANL.

DAR	Design Authority Representative. A delegate of the Site Chief Engineer [ISD 342, Design Authority]
Deputy Building Officials	Individuals delegated total or partial authority to act for the LBO. The ES Division Design Engineering Group Leader is delegated as a Deputy to act in the LBO's absence. The LANL Fire Marshal is delegated as Deputy acting for all fire and life-safety related matters. [IBC-GEN App A (LBC) 103.3]
DPIRC	Design professional in responsible charge; the engineer or architect of record. For small LANL-designed projects, professional registration is normally not required (see ESM Ch 1 Z10 Design Output section), but the DPIRC must be appointed by the Engineering Manager.
EOR	Engineer of record, essentially the same as DPIRC.
ES-DE	Design Engineering Group of Eng Services Division of LANL
ESM	Engineering Standards Manual
Fabricator	For this chapter only, the firm fabricating structural steel or prefab concrete offsite
FDAR	Facility DAR
IAS	International Accreditation Service, a subsidiary of ICC
IBC	International Building Code, published by ICC. Internal link via I.
ICC	International Code Council
ICC-ESR	Evaluation Service Report issued by ICC-ES Subsidiary of ICC. Ers are legacy Evaluation Reports issued for the UBC.
IEBC	International Existing Building Code, a product of ICC. Internal link via I.
LANL Inspector	A direct-hire (i.e., LANS) or subcontractor employee performing duties approved by the LANL Chief Inspector). May be written as inspector.
LBC	LANL Building Code; the IBC as amended by LANL (i.e., App A of this Section IBC-GEN). Where the LANL Standards including this chapter invoke the IBC, interpret to mean the LBC (except in obvious references to the source document; the term "IBC" is used at this time due to higher recognition).
LBO	LANL Building Official. The Division Leader of Engineering Services
LCI	LANL Chief Inspector. Selected individuals *in ADPMGT CM-CE Group* or other organization appointed by the LBO to oversee test and inspection aspects of LBC/LEBC enforcement.
LEBC	LANL Existing Building Code, amendments to IEBC for buildings and systems including programmatic ones.
ML	management level, from LANL's 4-tiered graded approach to rigor per AP-341-502, Management Level Determination.
PR-ID	Project Review & Requirements Identification system, a LANL intranet-based system for determining and tracking requirements.
Project	Any type of work/job/task/or any other terminology that is subject to IBC's scope regardless of funding source or facility arrangement.
Routine Inspection (or Inspection)	Inspections done by LANL or LANL's agent for general conformance to the design and LANL Standards, including those required by the IBC, but not a special inspection.
Special Inspection	A process of inspection, testing, and reporting by approved special inspectors to assure the LBO that the construction of critical elements, materials, and life safety systems is being performed in accordance with the

	approved construction documents and IBC Ch 17.
Special Inspection Agency (SIA)	Organization providing Special Inspectors and managing their training and qualification in accordance with this Chapter. Also known as Inspection Agency. This is LANL or its subcontractors.
Special Inspector (SI)	Individual who has specialized knowledge, training, experience, and certification(s) for one or more of the types of construction subject to special inspection.
Subcontractor	Firm hired by Contractor, i.e., LANS (a sub to DOE).
Testing Agency	A firm providing independent, certified test results.

4.0 Responsibilities and Duties[5]

4.1 LANL Building Official (or Designee)

A. The LBO has the overall responsibility and authority for implementing this procedure and the activities and duties herein.

B. The LBO has the overall responsibility for enforcing the IBC/IEBC. The LBO may delegate some of his/her duties to Deputy Building Officials, Chief Inspectors, and others as necessary.

C. The LBO or delegates shall review construction documents for erection, alterations, demolitions, and moving of buildings and structures.

D. The LBO or designee shall inspect (as necessary) the premises for compliance and enforce compliance with the provisions of the ESM. Exceptions:

1. Fire system inspections are delegated to the Fire Marshal (a Deputy Building Official) or Fire Group as applicable.
2. Security and telecommunications are inspected by LANL groups responsible for those systems.
3. Others as recognized or delegated by the LBO.

E. The LBO or delegate shall keep all related records required by the IBC for the period required per the LANL Records Inventory and Disposal Schedules (RIDS).

F. The LBO or designee shall make all the required inspections or have the authority to accept/reject reports of inspection by approved agencies or individuals.

G. The LBO or delegate is responsible for approving Special Inspection Agencies (SIAs) and Special Inspectors (SIs) to perform the duties specified by the Code, this ESM Chapter, and approved Inspection Plans developed for individual projects/jobs. This includes the authority to revoke approvals as warranted.

H. The LBO or delegate is responsible for approving field and laboratory test agencies and inspection agencies and personnel utilized on the LANL site under the scope of the IBC,

[5] Much of this Chapter's material is derived from IBC 2006 Chapters 1 and 17. For qualification, LBC amendments to IBC App A govern along with this subsection. Other source material for this Chapter is from "Model Program for Special Inspection," ICC Item 1035S4 and "2006 IBC Special Inspections: Understanding and Developing a Special Inspection Program," ICC Item 1045S06. Also consulted: Clark Co, NV Building Development program Technical Guidelines etc. http://www.co.clark.nv.us/development_services/index.htm

as well as approval of offsite structural element fabricators. The LBO shall maintain a list of agency approvals. *Note: Approvals are currently being captured by special notations in the Institutional Evaluated Suppliers List, which is used primarily for ML-1/ML-2 and certain ML-3 approvals http://int.lanl.gov/orgs/qa/pq/ (internal only); a website solely for this purpose may be added or substituted for the IESL in the future.*

I. The LBO or delegate is responsible for approving offsite structural fabricators including sub-tiers under the provisions of IBC Chapter 17 (per ESM Ch 16 Section IBC-FAB).

J. The LBO or delegate is responsible for approving the design professional's Construction QA Plan (CQAP) and may require a pre-construction conference to review the program with all applicable members of the construction team.[6] The inspection program is further discussed in ESM Chapter 16 Section IBC-IP, IBC Inspection Process.

K. LBO program self-assessments are required[7]. Criteria for self-assessment can be found in IAS AC251, *Accreditation Criteria for Building Departments/Code Enforcement Agencies*, including the applicable sections of ISO/IEC Standard 17020, *General Criteria for the Operation of Various Types of Bodies Performing Inspection*. http://www.iasonline.org/Accreditation_Criteria/

1. In addition to self-assessments, LBO may consider external assessments. These could include assessment of plan review effectiveness through occasional use of contracted plan reviewers (e.g., advertisers in ICC publications). LBO may also consider an outside assessment of overall program effectiveness via IAS accreditation to AC251 or the ISO Building Code Effectiveness Grading Schedule (BCEGS) program.

4.2. **Chief Inspectors** and staff personnel shall be assigned and designated by the LBO to administer parts of the provisions of the IBC and the LANL Engineering Standards including the specific Electrical, Mechanical, and Plumbing Codes adopted and amended by the ESM. As delegated by the LBO, Chief Inspectors shall act on behalf of the LBO to perform duties of evaluating test and offsite structural fabrication agencies and managing or performing oversight of inspection and welding personnel who work onsite -- their training and certification, evaluating their performance, performing surveillances related to IBC work on site, developing related LANL inspection procedures, acting as subject matter experts (SME), and other duties assigned by the LBO. Duties are further described in other Chapter 16 sections.

CM-Construction Engineering Group is responsible for all inspections of IBC/IEBC scope work. CE Group Leader may, in writing, delegate or authorize other qualified organizations to perform such inspections within the qualification limitations imposed by the LANL IBC Program.

Note: CM-Construction Engineering Group responsibility for construction inspection may extend beyond the ESM IBC Program scope through Construction Management Procedure CMP 282, *Construction Acceptance Inspection and Testing*, and other policies or agreements. Two examples of this are ASME B31.3 piping inspections and certain "tenant improvement" type work where the majority of the work is not IBC-related but aspects affect the facility to the extent the work is subject to the overall IBC Program as discussed above under Scope.

- The listing of LANL Chief Inspectors is here.

[6] IBC 2003 Section 1704.1
[7] DOE O 414.1C on quality assurance includes criterion for management self-assessment. See also IMP 328, Assessment Program.

4.3. **Design (Plan) Reviewers** shall be qualified engineers, architects, and others in various disciplines whose LANL organizations are established as design reviewers by LANL institutional procedures (thus reflected in PR-ID).

A. Responsibility for reviews against the primary building codes (LANL versions of IBC, UPC, UMC, and NEC) rests with the ES-DE Group Leader (GL). DE GL will rely on other organizations for aspects of such reviews when they are authorized by LANL policy to do so (e.g., fire reviews by Fire Protection Group). DE GL may subcontract review activity to outside firms (i.e., third parties), or may augment DE staff by, in writing, appointing other qualified LANL individuals to perform review functions.

B. The LBO further delegates to ES-DE (and successors) the role of ensuring compliance with the applicable design review procedures, including complete resolution of comments, on behalf of all reviewing organizations (see procedure steps later). *Guidance: Those procedures include the ECN, DCP, and ADPMGT Design Review Procedure 308 and its successors. Such procedures require that designs be reviewed by the ES-DE organization, plus others as needed per PR-ID including Fire Protection Group, the Fire Marshal, Security & Safeguards, Utilities, and others including ESH&Q, Rad Protection Engineering, OEOD-ADA etc.*

4.4. **LANL Project and Construction Management, Project Engineering, and other facilities personnel**, through Acquisition Services Management (ASM; Procurement and the Contract Administrator), are responsible to assure that proper ESM (including IBC) direction is included in subcontracts. This should be done by requiring the Design Professional's compliance with the LANL Engineering Standards, including Master Specification Section 01 4000, Quality Requirements.

4.5 **Project Management, Project Engineering, and other facilities personnel** that manage the work shall assure that the project/job or any other designated work under IBC purview does not proceed until they have obtained LBO approval to proceed. In addition, they are responsible for assuring compliance to the IBC on the project down to the various sub-tier subcontractors and suppliers.

A. Project management or other facilities personnel that manage the work shall have necessary programs and procedures in place to address the controls and process within their organization to assure that IBC requirements are fully implemented. This includes instructing personnel and passing-down necessary controls to sub-tier levels on a project and assuring that the LBO Chief Inspector will be properly notified of non-conforming conditions on any IBC-related work.

B. Project management shall notify the LBO Chief Inspector as soon as possible when sub-standard construction has occurred on the project (including work by testing agency or in fabrication/manufacturer shops).

C. LANL project managers shall use the PR-ID system to ensure such projects are tracked.

4.6 **Duties and Responsibilities of the Prime Subcontractor**

A. The Subcontractor's duties are as described by their contract with LANL; requirements specific to IBC and quality are detailed in LANL Master Specification Section 01 4000, Quality requirements.

4.7 **Duties and Responsibilities of the Design Professional in Responsible Charge**

A. Develop initial Test and Inspection and Plan which shall include special inspections and other critical inspections and tests based on the design (see Section IBC-IP).

B. Submit required structural observations[8] to the LANL Lead Chief Inspector. Structural observations are the responsibility of the structural engineer of record (EOR) unless otherwise stated in the Subcontract. EOR must subcontract observations if he/she is in the same company as the prime Subcontractor,[9] and LBO must approve observation performance by persons other than the structural EOR.

C. Edit LANL Master Specification Section 01 4000, Quality Requirements and include in Project Specification. That section shall include the following Subcontractor requirements:

1. Assure that they use only LBO-approved testing agencies.

2. Notify the inspector. The holder of the LBO's authorization to proceed or their duly-authorized agent is responsible for notifying the LANL building code inspectors regarding individual inspections required by the LBO.[10] Adequate notice shall be provided so that the inspectors have time to become familiar with the project.

3. Assure that off-site structural steel and concrete fabrication activities are performed by an LBO-approved shop, when such shops exist in approval listing. Until they exist, or with LBO permission, arrange for the IBC-related activities to be inspected in the shop by an LBO-approved special inspector during fabrication.[11] As an alternative, LANL will provide Special Inspectors in-shop at Subcontractor's expense and the Contract Sum will be adjusted by Change Order. Note: SI or shop approval not required for burning and cutting of mild steel (e.g., ASTM A36).[12]

5.0 Procedure

5.1. Project, job and/or work planning shall determine if the work involves the IBC or IEBC. If any part of the work involves them, then the project must inform the LANL Chief Inspector. The LBO has appointed the design reviewers (plans examiners) and chief inspector(s) that will review the design drawings, specifications, inspection plan(s), test agencies, etc.

5.2. The design review and chief inspectors reviews will be submitted back to the design professional in responsible charge via the Project Engineer along with any required corrections or improvements. These reviews will include evaluation that the CQAP/inspection plan is aligned to the drawings and specifications.

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[8] IBC 104.7 and 1709.1. This is expected to be required in under half of all IBC jobs (e.g., when high occupancy, critical buildings, and/or hazardous contents).

[9] IBC 2003 104.7, 1709.1. SER best understands design, load path, and critical fabrication issues, so is best person to perform observations. Clark County, NV does not consider it a conflict of interest for SER to perform observations (TG100-2008 7.4), nor does Phoenix as of Apr 2008 (latter cautioned against SER who is in same company as builder).

[10] IBC 2003 109.5

[11] IBC 2003 1704.2

[12] Removal of mild steel should not affect strength/quality in the same way as welding, so LANL takes exception for this activity.

5.3. The project must assure that applicable test agencies, inspection agencies, and offsite structural element fabricators required by the code are on the LBO-approved list. The project/job must review the LBO's approved list(s) for field and laboratory testing agencies and approved fabricators. If the testing agencies or fabricators that they prefer to use are not on that list they must submit the necessary data to the LBO for evaluation and approval. The project/work/job team is responsible for submitting any requests with at least two (2) weeks lead time to the Chief Inspector.

5.4. The project must develop a construction QA plan that delineates the degree of test, inspection, and special inspection for the work being done. The inspection plan shall be approved by the design professional in responsible charge (DPIRC) and submitted to the LANL Contract Administrator for LANL facility engineering review and approval along with the design package. See Chapter 16 Section IBC-IP, IBC Inspection Process, for related requirements. The Plan must also follow IBC Chapter 17 requirements on degree of inspection ("continuous" and "periodic"), and the specific ICC-ESRs and LANL approval documents for special cases (e.g., post-installed anchors).

Note: The LANL-approved design documents supersede the ICC ESRs if there is a difference.

5.5. Permitting: Following all comment resolution, a review for LBO approval to construct must be performed. The project shall submit to ES-DE (1) two copies of the design, (2) a PR-ID printout showing the required reviews, and (3) evidence of having satisfied those reviews ("no comment" statements, Design Review Record [DRR] document comment resolutions initialed by reviewers, or equivalent).[13] *Guidance: Details of the DE process for permitting are captured in an ES Division-level procedure (draft as of 4/2008).*

5.6. ES-DE shall review the above and, when acceptable, indicate approval on the design package (approval stamp).[14] One set of materials will be returned to project.

5.7. Once LBO approval is indicated, the project can allow start of the physical construction work. Physical construction including offsite structural element fabrication work on a project shall not start until authorized by the LBO after evaluating that the project has complied with all necessary IBC and LBO requirements.

Note: ESM Chapter 1 Section Z10 states that for design-build projects, documents shall be sealed by the DPIRC before construction begins. Exceptions: Site preparation and excavation can proceed at risk (prior to sealing) with ADPMGT and LBO approval.

5.8. Once the project begins physical construction, the project must follow the approved Construction QA Plan for inspection.

5.9. Inspection shall be conducted in accordance with ESM Ch 16 Section IBC-IP, IBC Inspection Process.

5.10. The Offsite Structural Fabricator Approval Process (Ch 16 Section IBC-FAB) governs the process for approving fabricators to perform certain IBC work without the necessity of having in-shop special inspection, then submitting a Certificate of Conformance.

5.11. Testing and inspection agencies shall be approved and operate in accordance with the approved inspection and testing agency process procedure (Ch 16 Section IBC-TIA).

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[13] Building Dept approval ensures compliance with engineering change control procedures, the LIR-driven requirement to use the PR-ID, and municipal practice. Also, LANL Construction Inspection needs to be able to determine approved design quickly.

[14] This process is LANL equivalent to obtaining plan reviews for a building permit. Site placarding is not used.

5.12. All required records will be submitted to the Chief Inspector as required by IBC, this procedure, and the Construction QA Plan.

5.13. When **changes occur to previously-LBO-approved design**, re-approval by LBO is only required automatically when the changes either (1) affect life safety or (2) result in new construction documents – i.e., are extensive enough to necessitate a drawing or DCP/ECN revision to clearly direct the work in the field (not for DCN incorporation or as-builting that occurs after work is complete)[15]. In addition, the Design Authority Representative must review all changes and may request LBO-restamping. (ref. ADPMGT Procedure 107, Project Configuration Control, rev 4 or later).

- All design changes must be reviewed by the original or equivalent LANL reviewers in accordance with controlling design review procedures (i.e., follow a process similar to that of the original approval), with the decision for re-review by ES-DE etc. being made by the Design Authority Representative.
- Any proposed deviation from LANL Standards or their referenced national standards requires use of the variance process in ESM Ch 1 Section Z10; any field variance from standards or design submitted for LANL acceptance requires an NCR to disposition (NCRs further discussed in Z10 and Section IBC-IP).

Note: Where the following definitions conflict with those in the Conditions of the Subcontract, those documents shall take precedence.

Beneficial Occupancy (or "Mechanical Completion" or "Use and Possession prior to Completion")[16]	Terms used to describe the procedure when LANL occupies or makes use of any part of the work prior to Substantial Completion or Final Completion. This does not refer to LANL Project Team members including inspectors, but could include installers of LANL-furnished/installed equipment or building tenants. The presence of such personnel at the project site may cause disruption of the Subcontractor's activities and is discouraged; furthermore, such occupancy is subject to conditions set forth in the construction contract. LANL is not required to take such occupancy and may wait for Final Completion to use or occupy the site; however, if LANL decides to occupy any portion of the project space prior to Final Completion, LANL is required to issue a Certificate of Beneficial Occupancy. A Certificate of Beneficial Occupancy shall not be issued without concurrence of the LBO if Beneficial Occupancy will occur prior to Substantial Completion.
Substantial Completion	Means that stage in the progress of the work, as determined by the Subcontract Tech Representative, when the work is complete and in accordance with the contract documents except only for completion of minor items which do not impair LANL's ability to occupy and fully utilize the work for its intended purpose (this may require limiting access by the subcontractor to the site for security or safety reasons). Any liquidated damages are calculated. A Certificate of Substantial Completion shall not be issued until after a Certificate of Occupancy is issued by the LBO, all work is in place, all required agency approvals have been received, and all systems and equipment are fully functioning as verified by commissioning. Minor items (punch list) shall include only patching, repair or replacement, and clean-up. Examples of acceptable punch list items include replacement of light switches, touch-up painting, repair of scratches on walls or floors, replacement of locks which do not

[15] LBO re-approval for life safety because that is a primary purpose of the LBO review; re-approval for new work documents because inspectors require work be performed to LBO-approved documents.
[16] Definitions/requirements adapted from UC Office of President Facility Managers Manual at http://www.ucop.edu/facil/fmc/facilman/volume5/pt2ch7.pdf#search=%22beneficial%20occupancy%22 "Use and Possession" is a FAR term currently used in LANL subcontract documents (e.g., Article A-360). Mechanical and Physical Completion are terms used in CM-Div CMP 300 rev. 0.

	function properly, replacement of filters or light bulbs, and other similar items.
Final Completion (or "Physical Completion")	The STR performs a final inspection upon receipt of written notice from the subcontractor that the work is ready for final inspection and acceptance. Final Completion is determined to be when the STR finds that the work is fully completed and in accordance with the contract documents. Once STR accepts, final payment is made to the Subcontractor.

5.13 Certificate of Beneficial Occupancy / Certificate of Occupancy

A. This includes both new facilities and existing structures being modified or changing occupancy and thus subject to the IEBC.

B. The LBO will perform any IBC-related reviews deemed necessary before providing an approval for occupancy.

C. The person or organization requesting occupancy shall also be responsible to identify any substandard construction, safety concerns, or any other safety-impacting information that is not included in the records package.

D. Use approval Forms 1 and 2, attached.

6.0 Qualification of Suppliers and Manufactured Products for Structural Work

6.1 On IBC and IEBC projects, the requirement for LBO approval of agencies and fabricators is summarized as follows (details are elsewhere is this Chapter):

- **Testing agencies**: A list of LBO-approved agencies is available in the IESL (entry must note specifically if approved for IBC). New requests should be sent to Chief Inspectors.
- **Offsite Structural Shop Fabricator approval** when conditions associated with IBC Section 1707 and 1704 are applicable. Contact a LANL Chief Inspector if fabricator approval is required; if the project's choice is to use special inspectors in the shop (the only choice for seismic resistant situation in IBC Section 1707); contact CM-CE Group Leader or Chief Inspector.
- **Special inspection and inspectors**: CM-CE Group Leader retains the approved list and evaluates potential special inspectors and compensatory measures.

6.2 Under the Special Cases section of the IBC (1704.13), **proprietary structural products** must be approved by the LANL Building Official (LBO) when such work is on buildings or building systems. The products requiring approval are those types of products[17] for which an ICC-ES Report exists. Examples are post-installed anchors and reinforcing steel splices/couplers.

A. Such components are automatically approved by the LBO if:

1. The components chosen are IBC-compliant-labeled (has been accepted by the most recent ICC evaluation report from ICC-ES [valid for the code edition in use or newer edition whichever is more stringent]) AND
2. The design and installation complies with the conditions of use and restrictions specified in the ICC report (in addition to and including following manufacturers

[17] That is, if similar products have ES listings, then the SPECIFIC product in question requires LBO approval if not listed by ES.

instructions, particularly where more stringent), and verified by special inspector(s).

B. Other special case structural-type components not automatically approved as noted above must be submitted to the ES-DE Structural Team which will broker LBO approval prior to use. *Guidance: This may involve derating; e.g., to stay well within elastic region.*

C. *In addition to this requirement to obtain LBO approvals, it is important to note that the general focus of ML-1/2 is primarily a quality assurance evaluation of the manufacturer's or supplier's quality program. The focus of IBC is to assure that proper independent testing has been accomplished. As a good example of this principle, at time of writing, the manufacturer of Bar-Lock brand "S"couplers claims to achieve 1.25% of yield per ACI-318 (for a #8 rebar) using a tube/sleeve of 8 inches while the ICC Evaluation Report (ER-5064) indicates that independent tests show it takes a 10"+ tube or sleeve to achieve 1.25% of yield.*

7.0 Attachments

Records
Form 1, Occupancy Approval Form -- Sample
Form 2, Building Completion Checklist -- Sample

Appendix A LANL Building Code (LBC)
Appendix B LANL Existing Building/System Code (LEBC)